

The HEIC Conversion Tax: File-Size Cost of Converting iPhone Photos to JPEG and PNG at Matched Perceptual Quality

Cleanor Labs Research Team

Cleanor Research Labs · Correspondence: hello@cleanor.app

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ABSTRACT

Every month, about 246,000 people search Google for "heic to jpg," and another 49,500 search "heic to png." Converting an iPhone photo out of HEIC feels free, but it is not: in a controlled benchmark of 96 encodes, converting a near-lossless HEIC to a quality-matched JPEG made the file about 2x larger, and converting it to PNG made it about 4.7x larger, for no visible gain in quality. HEIC is not the problem people think it is. The conversion is.

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KEYWORDS: heic to jpg, convert heic to jpg, heic to png, heic vs jpeg file size, best photo format to save storage, image compression benchmark

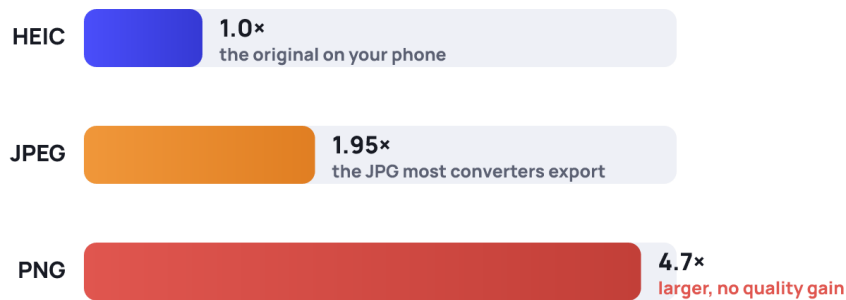
KEY FINDINGS

- At iPhone-typical quality (visually near-lossless, SSIM 0.98-0.99), a quality-matched JPEG is a median 1.95x the size of the HEIC it came from, ranging 1.5x to 2.9x across images.
- Converting the same HEIC to a lossless PNG, the output "heic to png" searchers get, is a median 4.7x larger, ranging 3.5x to 7.3x, and cannot look any better than the HEIC because PNG only re-stores pixels HEIC already finalized.
- The extra bytes buy nothing: at matched SSIM the JPEG looks the same, and the PNG is a pixel-for-pixel copy of the decoded HEIC.
- The cost scales with your library. Applying the measured multipliers to a typical 2 MB iPhone HEIC, 1,000 photos are about 2 GB as HEIC, about 4 GB as JPEG, and about 9 GB as PNG.
- If you must convert, convert to JPEG at quality 90-95, not to PNG, and keep the HEIC original when you can.

1. Why people convert HEIC in the first place

Convert an iPhone HEIC and it gets bigger

Relative file size at the same visual quality (HEIC = 1.0x)



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Kodak corpus · HEIC q60–q70 · ffmpeg SSIM

Figure 1. At the same visual quality, a converted iPhone HEIC is a median 1.95x larger as JPEG and 4.7x larger as PNG. PNG cannot look any better because it only re-stores the already-lossy HEIC pixels.

HEIC (High Efficiency Image Container, an HEVC-encoded image) has been the iPhone default since iOS 11 in 2017. It is roughly half the size of an equivalent JPEG, which is exactly why Apple adopted it. But HEIC is still awkward outside the Apple ecosystem: some Windows apps, older photo editors, web upload forms, and print services either reject it or render it wrong. So people convert.

Search demand shows the scale of it. Across a Google Keyword Planner pull, the intent to leave HEIC dwarfs the intent to adopt it: "heic to jpg" alone runs about 246,000 searches a month in the United States, with "convert heic to jpg" adding 60,500, "heic to png" 49,500, "heic to jpeg" 22,200, and "heic converter" 8,100. Combined, that is well over 380,000 monthly searches for getting out of HEIC. Almost none of those people are told what the conversion costs them in storage.

2. How much bigger does a converted HEIC get?

To measure the conversion cost cleanly, we ran a reproducible benchmark rather than trusting a single anecdote. We took the 24 images of the Kodak lossless test suite as masters, encoded each to HEIC at four quality levels spanning aggressive to near-lossless (libheif/x265 quality 40, 50, 60, 70), then converted every HEIC to JPEG across an eight-step quality ladder and to lossless PNG. For each output we measured file size and perceptual quality (SSIM against the lossless master, computed with ffmpeg). That is 24 images x 4 HEIC levels = 96 source files and several hundred conversions.

The key comparison is at matched perceptual quality: for each HEIC, we interpolate the JPEG size at exactly that HEIC's SSIM, so we are comparing files that look equally good, not a small file against a pretty one.

HEIC quality	Mean SSIM	Matched-quality JPEG	Lossless PNG
q40 (aggressive)	0.931	4.65x	13.6x
q50	0.961	3.47x	8.5x
q60 (near-lossless)	0.978	2.51x	5.5x
q70 (near-lossless)	0.987	1.75x	3.9x

The higher the HEIC quality, the smaller the multiplier, because a near-lossless HEIC is already close to a high-quality JPEG in size. iPhone HEIC sits at the top of this range: iOS "High Efficiency" targets a visually lossless result, SSIM roughly 0.98 to 0.99. In that iPhone-faithful band (HEIC q60 to q70), a quality-matched JPEG is a median 1.95x the HEIC, and a lossless PNG is a median 4.7x, with the worst individual images hitting 2.9x for JPEG and 7.3x for PNG.

This reproduces the well-known rule that HEIC is about half the size of JPEG, and adds the number nobody publishes:

the PNG route, chosen by roughly 49,500 searchers a month, is four to five times worse than the file they started with.

3. The PNG trap

The single most wasteful thing you can do is convert HEIC to PNG. It feels safe, PNG is "lossless," so it must be higher quality. It is not. Your HEIC was produced by a lossy encoder the moment the shutter fired; those decisions are already baked into the pixels. Converting to PNG stores that

exact, already-lossy image without any compression, so you pay four to five times the bytes to preserve detail that is no longer there. PNG is the right format for screenshots, logos, and line art with sharp edges and flat color. For a photograph it is close to the worst possible choice.

Library size	As HEIC	As matched JPEG (1.95x)	As PNG (4.7x)
100 photos	0.2 GB	0.39 GB	0.94 GB
1,000 photos	2 GB	3.9 GB	9.4 GB
5,000 photos	10 GB	19.5 GB	47 GB

4. What the conversion costs your storage

Multipliers are easy to wave away until you apply them to a real library. A typical 12-megapixel iPhone HEIC is around 2 MB. Using the measured medians:

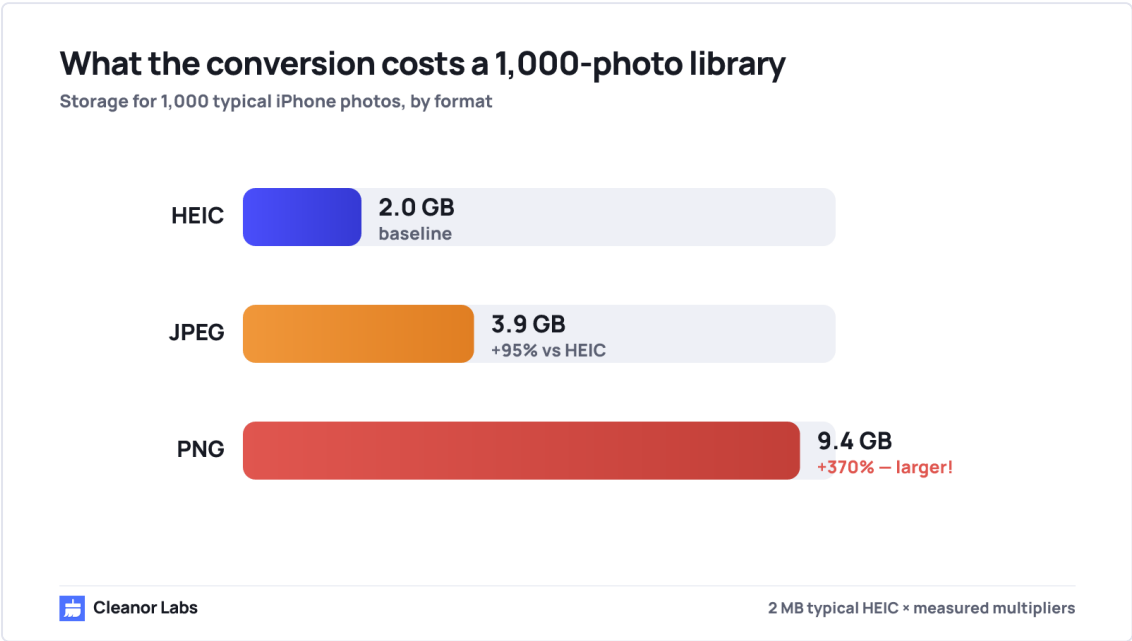


Figure 2. A 1,000-photo library is about 2.0 GB as HEIC, 3.9 GB as quality-matched JPEG, and 9.4 GB as PNG, applying the measured multipliers to a typical 2 MB iPhone HEIC.

A 5,000-photo library that fits in 10 GB as HEIC needs about 47 GB as PNG, enough on its own to fill the free tier of most phones and push someone into buying more iCloud or a new device. The photos everyone blames for full storage are frequently not the originals but the bloated copies people made by converting them.

5. If you have to convert, do it right

Converting is sometimes unavoidable, a form that only accepts JPEG, a Windows tool that will not open HEIC. When you must:

- Prefer JPEG over PNG for any photograph. JPEG at quality 90 to 95 is visually indistinguishable from the HEIC and a fraction of a PNG's size.
- Do not push JPEG to quality 100. In our ladder, quality 100 roughly doubled the file again over quality 95 for no perceptible gain, because it is close to storing the image losslessly.
- Convert a copy and keep the HEIC original. The HEIC is your smallest faithful version; deleting it to "save space" after making a larger JPEG is backwards.

- Batch-convert only what actually needs it. If a service accepts HEIC, or you are just backing photos up, converting the whole library only multiplies its footprint.

6. How this was measured (reproducibility)

Corpus: the 24-image Kodak lossless suite (768x512 PNG masters), the same standard set used across image-compression research. Encodes: libheif/x265 at quality 40/50/60/70 for HEIC; libvips/mozjpeg for JPEG across quality 80 to 100; libheif decode to PNG for the lossless route. Quality metric: SSIM (All) against the lossless master via ffmpeg. Matched-quality JPEG size is interpolated to each HEIC's own SSIM from the JPEG quality ladder. Multipliers are content-dependent and vary per image; we report medians and full ranges. The raw per-image results and the summary are published as CSV alongside this report. The scripts are `heic-tax-benchmark.mjs` and `heic-tax-analyze.mjs`.

Absolute file sizes at 768x512 are smaller than a 12 MP phone photo, but the multipliers, being ratios at matched quality, transfer across resolution; the library table applies them to a stated typical 2 MB iPhone HEIC.

7. Frequently asked questions

Does converting HEIC to JPG reduce quality?

Slightly, but the bigger surprise is that it increases file size. Going to a JPEG that looks identical to the HEIC costs about 2x the bytes, because JPEG is a less efficient codec than HEVC. You lose a little quality and gain a lot of size.

Is HEIC or JPG better for saving storage? HEIC, clearly. At matched visual quality a HEIC is roughly half the size of a JPEG and a quarter to a fifth the size of a PNG of the same photo. If storage is your concern, keep photos in HEIC.

Should I convert HEIC to PNG? No, not for photographs. PNG is lossless and stores the already-lossy HEIC

pixels uncompressed, so it is a median 4.7x larger for no quality improvement. Use PNG only for screenshots, graphics, and images with sharp edges or transparency.

Why is my converted JPG bigger than the original HEIC? Because HEVC (HEIC) compresses photos far more efficiently than JPEG. To preserve the same visual quality, JPEG simply needs more bytes. Most online converters also default to a high JPEG quality or to PNG, which makes the gap larger.

What is the best way to free up photo storage then? Keep originals in HEIC, avoid converting in bulk, and remove genuine waste instead, duplicate and near-duplicate shots, large videos, and screenshots. Converting formats usually adds storage rather than saving it.

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